

CLAIMS

1. An airport navigation method for a plurality vehicles selected from the group comprising aircraft and surface vehicles, said method comprising
 - a. installing a GPS reference antenna at a known physical location, said physical location being GPS referenced;
 - b. preparing an airport map that is GPS referenced; said map containing at least one digital representation of features selected from the group comprising runways, taxiways, gate areas, geographical features of the area surrounding the airport, topography surrounding the airport, approach paths, departure paths and identified obstructions;
 - c. providing said map to a vehicular navigation computer system;
 - d. receiving GPS signals at said GPS reference antenna;
 - e. providing said received GPS signals to a Differential GPS base station;
 - f. calculating with said Differential GPS base station differential corrections;
 - g. providing said differential corrections to a radio transmitter;
 - h. broadcasting using said radio transmitter, said differential corrections to said vehicle;
 - i. receiving using a radio receiver located on said vehicle said broadcast differential corrections;
 - j. receiving GNSS signals using a GNSS antenna located on said vehicle and providing said received GNSS signals to a differential GNSS receiver located on said vehicle;
 - k. providing said received differential corrections to said differential GPS receiver;
 - l. calculating using said differential GPS receiver at least one differentially corrected information element selected from the group comprising 3-dimensional position, 2-dimensional horizontal position, vertical position, 3-dimensional velocity, speed, heading, vertical rate and time;
 - m. navigating said vehicle using said differentially corrected information using said vehicular navigation computer system that displays said location of said vehicle on said digital map.

2. An airport control and management method for a plurality vehicles selected from the group comprising aircraft and surface vehicles, said method comprising
 - a. installing a GPS reference antenna at a known physical location, said physical location being GPS referenced;
 - b. preparing an airport map that is GPS referenced; said map containing at least one digital representation of features selected from the group comprising runways, taxiways, gate areas, geographical features of the area surrounding the airport, topography surrounding the airport, approach paths, departure paths and identified obstructions;
 - c. providing said map to an airport control and management computer system;
 - d. receiving GPS signals at said GNSS reference antenna;
 - e. providing said received GPS signals to a Differential GPS base station;
 - f. calculating with said Differential GPS base station differential corrections;
 - g. providing said differential corrections to a radio transmitter;
 - h. broadcasting using said radio transmitter, said differential corrections to said vehicle;
 - i. receiving using a radio receiver located on said vehicle said broadcast differential corrections;
 - j. receiving GPS signals using a GPS antenna located on said vehicle and providing said received GPS signals to a differential GPS receiver located on said vehicle;
 - k. providing said received differential corrections to said differential GPS receiver;
 - l. calculating using said differential GPS receiver at least one differentially corrected information element selected from the group comprising 3-dimensional position, 2-dimensional horizontal position, vertical position, 3-dimensional velocity, speed, heading, vertical rate and time;
 - m. broadcasting differentially corrected position information indicative of said vehicle location using a radio transmitter located on said vehicle;
 - n. receiving said broadcast position information at said control and management computer system;
 - o. presenting said airport map on a display of said airport control and management computer system and

- p. displaying the location of said vehicle in said presented airport map using said received broadcast position information.
3. An airport navigation system , the system comprising:
- a. a GPS antenna used to receive broadcast signals from GPS satellites, said GPS antenna located at a known location, identified with 3-dimensional GPS compatible coordinates;
 - b. a differential GPS base station that receives GPS signals from said GPS antenna;
 - c. means within said differential GPS base station to calculate differential corrections consisting of psuedorange corrections;
 - d. a radio transmitter connected to said differential GPS base station;
 - e. means within said differential GPS base station to send psuedorange corrections to said radio transmitter;
 - f. a radio receiver located on a vehicle selected from the group comprising aircraft and surface equipment;
 - g. means on said vehicle to receive said psuedorange corrections using said radio receiver and means to provide said psuedorange corrections to an onboard differential GPS receiver;
 - h. means to calculate a differentially corrected position using said onboard differential GPS receiver and said received psuedorange corrections and
 - i. means to navigate said vehicle using said differentially corrected GPS position.